

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-300984

(43)Date of publication of application : 02.11.1999

(51)Int.Cl.

B41J 2/175

(21)Application number : 10-110320

(71)Applicant : BROTHER IND LTD

(22)Date of filing : 21.04.1998

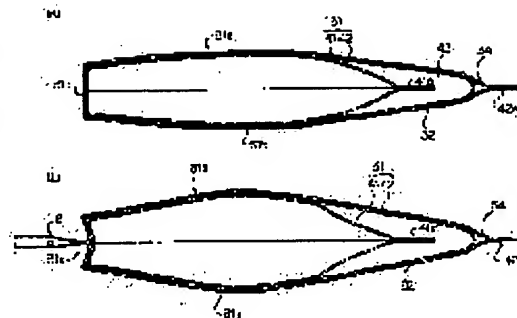
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(54) INK CONTAINER AND INK JET RECORDER EMPLOYING IT

(57)Abstract:

PROBLEM TO BE SOLVED: To contain an ink being supplied to a recording head under negative pressure through a simple and inexpensive structure.

SOLUTION: The ink container comprises a deformable flexible bag-like ink pack 31 containing an ink, and a spring member 32 buried therein. The ink pack 31 has double pack structure of inner and outer packs 42, 41 wherein the U-shaped spring member 32 is disposed between while being applied with both packs 41, 42 tightly. The spring member 32 urges the opposite side face parts of the ink pack 31 in the separating direction to bring about a negative pressure state in the ink pack 31.



LEGAL STATUS

[Date of request for examination]

29.03.2005

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] The ink container characterized by having the ink pack which the ink supplied to a recording head is the ink container contained in the state of negative pressure, and has two lateral portions which counter, and ink is contained inside and has deformable flexibility, and an energization means to energize in the direction which is laid under this ink pack and leaves said both-sides surface part of each other.

[Claim 2] Said ink pack is an ink container according to claim 1 with which it is the duplex pack structure of consisting of a pack of the inside and an outside and having a closed space among them, and said energization means is located in said closed space.

[Claim 3] Said closed space is an ink container according to claim 2 made into the reduced pressure seal condition.

[Claim 4] It is the ink container according to claim 2 or 3 which said energization means is a tabular spring member, and has the two attachment sections to which this spring member is located near the both-sides surface part of an inside pack, and the connection section of U typeface which connects this both attachment section across the edge of an inside pack.

[Claim 5] The attachment section of said spring member is an ink container according to claim 4 which has the shape of a flat spring which was multiple-times-crooked, or curved from the joining segment with the connection section located in the center, and has been prolonged outside.

[Claim 6] The attachment section of said spring member is an ink container according to claim 5 each part of whose on either side is what is formed in bilateral symmetry and has the 1st part of the shape of a typeface of KO by which the end section was connected with the connection section, and the 2nd part of the shape of a typeface of KO by which it is installed by this 1st part and the end section is connected with the other end of the 1st part.

[Claim 7] For said bending part, the edge of the pack of the inside which said ink pack bends a sheet-like ingredient, welds the circumference, it is formed in saccate, and said connection section exceeds is an ink container according to claim 5 or 6 which is a part for the welding of the opposite side.

[Claim 8] The ink container characterized by to have an energization means energize in the direction which is laid under the saccate ink pack and this saccate ink pack which the ink supplied to a recording head is the ink container contained in the state of negative pressure, and has two lateral portions which counter, and ink is contained inside and has deformable flexibility, and separates [as opposed to / for one / said / lateral portion / the lateral portion of another side] a circumference part from a central part by the small force.

[Claim 9] Said energization means is an ink container according to claim 8 which is a thing equipped with the 1st part energized in the direction which leaves the central part of one [said] lateral portion to the lateral portion of another side, and the 2nd part prolonged along with one [said] lateral portion from the 1st part.

[Claim 10] Said 2nd part is an ink container according to claim 9 which is what was multiple-times-crooked, or curved from the 1st part, and is prolonged towards the circumference part of a lateral portion.

[Claim 11] The recording head which records on a record medium by breathing out ink, and the ink container which stores ink, In case it is prepared in the ink container applied part equipped with this ink container removable, and this ink container applied part and an ink container applied part is equipped with said ink container In an ink jet recording device equipped with the connection member of the shape of a hollow needle which is combined with said ink container and leads the ink in said ink container to a recording head The saccate ink pack which has the deformable flexibility by which it has two lateral portions which said ink container counters, and ink is contained inside, It has a spring means to energize in the direction which is laid underground in this ink pack and leaves one [at least] lateral portion of the both-sides surface part of said ink pack to the lateral portion of another side. The energization force of said spring means The ink jet recording device characterized by being set up so that the direction of the part distant from the point of the combined connection member may become smaller than a near part.

[Claim 12] Said spring means is an ink jet recording device according to claim 11 which is a thing equipped with the 1st part energized in the direction which leaves the part in which the point of said connection member is located in one [said] lateral portion to the lateral portion of another side, and the 2nd part prolonged along with one [said] lateral portion from the 1st part.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the ink container with which the ink supplied to a recording head is contained in the state of negative pressure, and the ink jet recording device using it.

[0002]

[Description of the Prior Art] In order to prevent that positive pressure acts on the nozzle of engine-performance maintenance of a recording head, or a recording head, and ink leaks in an ink jet recording device conventionally, there are some which maintain the ink supply pressure which acts on a recording head to predetermined negative pressure by arranging the liquid ink side of an ink cartridge in a low location rather than the nozzle of a recording head.

[0003] With such equipment, from the reasons of there being constraint of the arrangement location of an ink tank to a recording head, the ink cartridge which makes the interior of a flexible bag generate negative pressure is proposed by having the flexible bag which holds ink in the interior, and putting a spring member between the plate-like part material of the pair which has rigidity in the interior of this flexible bag, and the plate-like part material of this pair so that it may be indicated by JP,6-183023,A, for example.

[0004]

[Problem(s) to be Solved by the Invention] However, in such an ink cartridge, since it is the structure of preparing the plate-like part material and spring member of a pair in the interior of a flexible bag, whole structure becomes complicated. Therefore, it is not suitable for mass-production nature, and expensive.

[0005] This invention was made in view of this point, and aims at offering the ink jet recording device using the ink container and it which can contain the ink supplied to a recording head as it is also at easy and cheap structure in the state of negative pressure.

[0006]

[Means for Solving the Problem] The ink supplied to a recording head is the ink container contained in the state of negative pressure, and invention of claim 1 is equipped with the ink pack which has two lateral portions which counter, and ink is contained inside and has deformable flexibility, and an energization means to energize in the direction which is laid under this ink pack and leaves said both-sides surface part of each other. Here, I hear that the energization means is formed in the ink pack in one, and that an energization means is laid under the ink pack means that what is necessary is to just be embedded so that a part or all of an energization means may not separate from an ink pack in the ink pack itself.

[0007] According to invention of claim 1, by the energization means, the both-sides surface part of an ink pack is energized in the direction left mutually, and the ink inside a pack is made into a negative pressure condition. Therefore, even if an ink container is arranged more nearly up than a recording head, ink leaks from the nozzle of a recording head and does not come out it. Moreover, since a part or all of an energization means is laid under the ink pack and united with it, attachment of attaching an energization means is not needed for an ink pack.

[0008] In the ink container of claim 1, it is the duplex pack structure where said ink pack consists of a pack of the inside and an outside, and has a closed space among them, and, as for invention of claim 2, said energization means is located in said closed space.

[0009] According to invention of claim 2, since an ink pack is the duplex pack structure which consists of a pack of the inside and an outside, it becomes possible to locate an energization means in a closed space between them of it simply.

[0010] As for invention of claim 3, said closed space is made into the reduced pressure seal condition in the ink container of claim 2.

[0011] According to invention of claim 3, since a closed space is made into the reduced pressure seal

condition, the pack of the inside and an outside sticks to an energization means, they are united, and the energization force of an energization means acts on the pack of an outside and the inside efficiently.

[0012] In claim 2 or the ink container of 3, said energization means is a tabular spring member, and invention of claim 4 has the two attachment sections to which this spring member is located near the both-sides surface part of an inside pack, and the connection section of U typeface which connects this both attachment section across the edge of an inside pack.

[0013] An energization means consists of connect the two attachment sections locate near the both sides surface part of an ink pack in the connection section of U typeface exceeding the edge of an inside pack , and , according to invention of claim 4 , serves as structure with the easy energization means itself , the reservoir of the ink in an inside pack secures , and it becomes that it is possible to locate an energization means simply in a closed space between the packs of the inside and an outside .

[0014] Invention of claim 5 has the shape of a flat spring to which it was multiple-times-crooked, or the attachment section of said spring member curved from the joining segment with the connection section located in the center, and has extended outside in the ink container of claim 4.

[0015] According to invention of claim 5, the energization force in which it is made to become small gradually and can set at least to each part of an ink pack with the structure where it is multiple-times-crooked, or the locked member of a spring member curves from a joining segment with the connection section located in the center, and is prolonged outside in the shape of a flat spring as the energization force of a locked member separates from the connection section is adjusted.

[0016] The 1st part of the shape of a typeface of KO by which, as for invention of claim 6, the attachment section of said spring member was formed in bilateral symmetry in the ink container of claim 5, and the end section was connected with the connection section for each part on either side, It has the 2nd part of the shape of a typeface of KO by which it is installed by this 1st part and the end section is connected with the other end of the 1st part.

[0017] According to invention of claim 6, it is supposed that it is possible to cover the whole abbreviation on the front face of an outside in the both-sides surface part of an ink pack as the easy configuration of using the 1st and 2nd parts of the shape of a typeface of KO is also, and to prepare the attachment section of a spring member, the whole outside front face is covered, and the energization force of a spring member is made to act. It is adjusted so that the energization force may become small gradually, as the energization force by the 2nd part is smaller than the energization force by the 1st part and separates from the connection section with it.

[0018] Said bending part of the edge of the inside pack with which said ink pack bends a sheet-like ingredient in claim 5 or the ink container of 6, welds the circumference, and is formed in saccate, and said connection section exceeds invention of claim 7 is a part for the welding of the opposite side.

[0019] According to invention of claim 7, a sheet-like ingredient is bent, and the ink pack welded and constituted strains this bending part by energization of an energization means, and is made saccate [of a three-dimensions configuration].

[0020] The ink supplied to a recording head is the ink container contained in the state of negative pressure, and invention of claim 8 is equipped with an energization means energize in the direction which is laid under the saccate ink pack and this saccate ink pack which has two lateral portions which counter, and ink is contained inside and has deformable flexibility, and separates [as opposed to / for one / said / lateral portion / the lateral portion of another side] a circumference part from a central part by the small force. In this configuration, that a part or all of an energization means should just be laid under the ink pack itself, one lateral portion of an ink pack may be fixed and you may be the case that only the lateral portion of another side is deformable.

[0021] According to invention of claim 8, by the energization means currently laid under the ink pack, it is energized in the direction which one lateral portion leaves to the lateral portion of another side by the force in which a circumference part is smaller than a central part, among the both-sides surface parts of an ink pack, and the ink in an ink pack is made into a negative pressure condition.

[0022] Invention of claim 9 is equipped with the 1st part energized in the direction from which said energization means separates the central part of one [said] lateral portion to the lateral portion of another side, and the 2nd part prolonged along with one [said] lateral portion from the 1st part in the ink container of claim 8.

[0023] By the 2nd part to which the central part of one lateral portion is energized in the direction left to the lateral portion of another side, and extends along with one [said] lateral portion by the 1st part of an energization means from the 1st part being prepared according to invention of claim 9 It will be energized in the direction which one lateral portion leaves to the lateral portion of another side by easy structure by the

force in which a circumference part is smaller than a central part.

[0024] Invention of claim 10 was set in the ink container of claim 9, and from the 1st part, it was multiple-times-crooked, or said 2nd part curved, and it is prolonged towards the circumference part of a lateral portion.

[0025] According to invention of claim 10, it will be energized in the direction which one lateral portion leaves to the lateral portion of another side by the force in which a circumference part is smaller than a central part as it is also at easy structure by forming the 2nd part, as it is multiple-times-crooked, or it curves from the 1st part and it extends towards the circumference part of a lateral portion.

[0026] The recording head which records by invention of claim 11 breathing out ink to a record medium, The ink container which stores ink, and the ink container applied part equipped with this ink container removable, In case it is prepared in this ink container applied part and an ink container applied part is equipped with said ink container In an ink jet recording device equipped with the connection member of the shape of a hollow needle which is combined with said ink container and leads the ink in said ink container to a recording head The saccate ink pack which has the deformable flexibility by which it has two lateral portions which said ink container counters, and ink is contained inside, It has a spring means to energize in the direction which is laid underground in this ink pack and leaves one [at least] lateral portion of the both-sides surface part of said ink pack to the lateral portion of another side. The energization force of said spring means It is set up so that the direction of the part distant from the point of the combined connection member may become smaller than a near part.

[0027] If according to invention of claim 11 ink is consumed since the energization force of a spring means is set up so that the direction of the part distant from the point of the combined connection member may become smaller than a near part, a configuration will change from the direction of the part distant from the point of the combined connection member so that spacing between lateral portions may become narrow. Therefore, even if the residue of the ink in an ink pack decreases, the ink is collected near the point of a connection member, and it is supposed that it is possible to consume the ink in an ink pack effectively.

[0028] Invention of claim 12 is equipped with the 1st part energized in the direction from which said spring means separates the part in which the point of said connection member is located in one [said] lateral portion to the lateral portion of another side, and the 2nd part prolonged along with one [said] lateral portion from the 1st part in the ink jet recording apparatus of claim 11.

[0029] According to invention of claim 12, the part in which the point of a connection member is located in one lateral portion by the 1st part of a spring means Since it is positively energized in the direction left to the lateral portion of another side and the 2nd part is prolonged along with one [said] lateral portion from the 1st part, the energization force of a spring means becomes smaller than the part where the part distant from the point of the combined connection member is nearer.

[0030]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained along with a drawing.

[0031] In drawing 1 which shows the outline configuration of the ink jet recording apparatus concerning this invention, the ink jet recording apparatus 51 is equipped with the recording head 52 which records on a record medium (not shown) by breathing out ink, and ink is supplied to this recording head 52 from the ink container 24 which stores ink. Said recording head 52 is carried crosswise [of a record medium] on the both-way carriage 53 formed movable, and the ink container applied part 55 by which it is equipped with said ink container 24 removable on this carriage 53 is formed.

[0032] Said ink container applied part 55 is fabricated with a synthetic-resin ingredient, and is equipped with the wall section 57 which has the ink reservoir room 56 inside. The wall section 57 is formed in the double box-frame construction which has front wall partial 57a and posterior-wall-of-stomach partial 57b, and serves as the ink reservoir room 56 where ink before the space part between said front wall partial 57a and posterior-wall-of-stomach partial 57b is injected is once stored.

[0033] It has the low wall section 58 prolonged more back than the lower limit of said wall section 57, and the side-attachment-wall section (only one side-attachment-wall section 59 is illustrated) in which it extends back and lower limit edges are formed successively by the low wall section 58 from the edges on both sides of said wall section 57, and the wearing crevice 61 where it is equipped with the ink container 24 by these walls removable is formed.

[0034] Furthermore, in case the wearing crevice 61 of the ink container applied part 55 is equipped with the ink container 24 removable, the connection member 62 of the shape of a hollow needle which is combined by being pierced in said ink container 24, and leads the ink in said ink container 24 to a recording head 52 through the ink reservoir room 56 is formed in the wall section 57 of said ink container applied part 55

through the tubed part material 63. In addition, the ink feed holes 64 are formed in the front wall partial 57a bottom of said wall section 57, and the recording head 52 is connected to these ink feed holes 64 through adapters 65 and 66. The upper and lower sides of a recording head 52 are covered by the arm top cover 67 and the discharge ring 68, respectively.

[0035] Said ink container 24 is equipped with the tabular spring member 32 as an energization means to energize in the direction which is laid underground in the saccate ink pack 31 which has the deformable flexibility by which it has two lateral portions 31a and 31b which counter, and ink is contained inside, and this ink pack 31, and leaves said both-sides surface parts 31a and 31b of each other. The both-sides surface part of the ink pack 31 is energized in the direction left mutually by the energization force of the spring member 32, and the ink supplied to a recording head 2 is contained in the state of negative pressure in the ink pack 31. Therefore, when the connection member 62 is inserted in the ink pack 31, there is no possibility of ink leaking and coming out from the nozzle of a connection part with the ink pack 31 or a recording head 52.

[0036] Moreover, it is the duplex pack structure of said ink pack 31 consisting of packs 41 and 42 of the inside and an outside, and having a closed space 43 among them, and the spring member 32 is located in said closed space 43. Said closed space 43 is made into reduced pressure seal space, the packs 41 and 42 of the inside and an outside stick and are united in the spring member 32, and the energization force of the spring member 32 is certainly transmitted to the packs 41 and 42 of an outside and the inside.

[0037] Here, let said closed space 43 be reduced pressure seal space at the point efficient [of the spring member 32 / energization / to each lateral portions 31a and 31b] and transmitted [the spring member 32 is simply unified in the state of laying under the ground between inside-and-outside both the packs 41 and 42, and] between because it is advantageous and desirable. however, inside-and-outside both the packs 41 and 42 are not necessarily stuck to the spring member 32 -- it is not necessary to make -- the setting order of the variation of tolerance of inside-and-outside both the packs 41 and 42 -- it is -- a few -- since the energization force of the spring member 32 is transmitted to each lateral portions 31a and 31b even if it produces the clearance between about, there is no practically big problem.

[0038] The packs 41 and 42 of the inside of said ink pack 31 and an outside are formed using the sheet-like ingredient. It turns up and piles up by end section 31c, and the horseshoe-shaped periphery except end section 31c is welded, it is formed in saccate, reinforcement becomes high in the periphery (a part for a welding), and it has been hard coming to deform each packs 41 and 42 of both from other parts. In the peripheries 31d and 31f which follow the end section, joining of the packs 41 and 42 of the inside and an outside is specifically carried out together. The edge of said end section 31c and opposite side It is only periphery 42a (a part for a welding) of the outside pack 42 for joining of the packs 41 and 42 of the inside and an outside to be carried out separately, and for periphery 41a (a part for a welding) of an inside pack to be located in the outside pack 42, and to be located outside. And the connection section 34 which the spring member 32 mentions later is located between periphery 41a of the inside pack 41, and periphery 42a of the outside pack 42. And said end section 31c is mostly held with the both-sides surface parts 31a and 31b at turgescence at a right angle, and is easy to pierce the connection member 62 by energizing the both-sides surface parts 31a and 31b of the ink pack 31 in the direction left mutually in an operation of the spring member 32.

[0039] In addition, although end section 31c which can be pierced in the connection member 62 also has dual structure of the packs 41 and 42 of the inside and an outside in the above-mentioned ink pack 31 So that what is necessary is to consider as dual structure in no parts, to lay the spring member 32 under the ink pack 31 in short using dual structure, and just to be able to unify them, and it may be easy to pierce the connection member 62 and it may become It is also possible to make only the part of end section 31c into the structure of one sheet which does not use a sheet-like ingredient as a duplex. Moreover, the thing to change in both ingredients -- may be this quality of the material, may be different material, and sheet thickness also thickens the inside pack 41 -- is also possible for the sheet-like ingredient which constitutes the packs 41 and 42 of the inside and an outside. Furthermore, it is also possible to use adhesion by adhesives besides thermal melting arrival and ultrasonic jointing as a junction means of a both sheet-like ingredient, and if it is the junction means which can be made into the dual structure which lays the spring member 32 underground and can be unified, it cannot be overemphasized that any junction means can be used.

[0040] On the other hand, said spring member 32 has the two attachment sections 33 and 33 located both-sides surface part 31a of the inside pack 41, and near 31b, and the connection section 34 of U typeface which connects these both attachment sections 33 and 33 exceeding periphery 41a which is the other end of the inside pack 41. Since the attachment sections 33 and 33 of said spring member 32 are made into the shape of a flat spring which was multiple-times-crooked, or curved from the joining segment with the

connection section 34 located in the center, and has been prolonged outside, they are the force in which a circumference part is smaller than a central part, and are energized in the attachment section 33 and the direction which spacing between 33 (lateral portions 31a and 31b) leaves.

[0041] And 1st partial 33a of the shape of a typeface of KO by which each attachment section 33 has the parts 33A and 33A of the right and left formed in bilateral symmetry, and the end section was connected with the connection section 34 for each partial 33A on either side, this -- it has 2nd partial 33b of the shape of a typeface of KO by which it is installed in 1st partial 33a side by side, and the end section is connected with the other end of 1st partial 33a.

[0042] When it explains more concretely, 1st partial 33a The 1st vertical-line-like section 33a1 to which the end section is connected with the connection section 34, and the other end extends linearly to near end section 31c of the ink pack 31, Towards the end section being connected with the other end of this vertical-line-like section 33a1, and intersecting perpendicularly with it, and the 1st striping-like section 33a2 prolonged in the method of outside, this -- it has the 2nd vertical-line-like section 33a3 which the end section is connected with the other end of the 1st striping-like section 33a2, and is prolonged to near periphery 41a of the inside pack 41 in parallel with the 1st vertical-line-like section 33a1. Moreover, the 1st vertical-line-like section 33b1 to which, as for 2nd partial 33b, the end section is connected with the other end of the 2nd vertical-line-like section 33a3 in 1st partial 33a through an articulated section 35, and the other end extends to near end section 31c of the ink pack 31 in parallel with the 2nd vertical-line-like section 33a3, Towards the end section being connected with the other end of this vertical-line-like section 33b1, and intersecting perpendicularly with it, and the 1st striping-like section 33b2 prolonged in the method of outside, this -- it has the 2nd vertical-line-like section 33b3 which the end section is connected with the other end of the 1st striping-like section 33b2, and is prolonged to near periphery 41a of the inside pack 41 in parallel with the 1st vertical-line-like section 33b1.

[0043] Thus, it is set up so that the direction of the circumference part which the energization force of the spring member 32 separated from the central part in which the point of the connection member 62 is located may become smaller than a near part, i.e., a central part. Namely, 2nd partial 33b has the energization force smaller than 1st partial 33a. The energization force is becoming small gradually in the order of the 1st vertical-line-like section 33a1, the 1st striping-like section 33a2, the 2nd vertical-line-like section 33a3, an articulated section 35, the 1st vertical-line-like section 33b1, the 1st striping-like section 33b2, and the 2nd vertical-line-like section 33b3.

[0044] If constituted as mentioned above, therefore, the ink pack 31 With the duplex pack structure which consists of packs 41 and 42 of the inside and an outside, since he is trying to locate the spring member 32 in a closed space 43 (reduced pressure seal space) between them The packs 41 and 42 of the inside and an outside stick in the front rear face of the attachment sections 33 and 33 of the spring member 32. One and ****, The both-sides surface parts 31a and 31b of the ink pack 31 are constituted, the energization force of the spring member 32 is certainly transmitted to the packs 41 and 42 of an outside and the inside, and the ink container 24 stores the ink in the ink pack 31 in the state of negative pressure.

[0045] and when according to such an ink container 24 it is and full restoration of the ink is carried out into the ink pack 31 before ink is consumed Although it is in the condition that the packs 41 and 42 of the ink pack 31 whole, i.e., the inside, and an outside expanded as it is conjointly indicated in drawing 3 (a) also as the energization force to a way outside the spring member 32 Since the energization force of the spring member 32 is set up so that the direction of a circumference part may become smaller than a near central part if ink is consumed, as shown in drawing 3 (b) A configuration changes from the direction of a circumference part so that spacing between lateral portion 31a and 31b may become narrow, and the remaining ink is collected near the point of the central part 62, i.e., a connection member. In addition, as for change of a configuration to which spacing between such lateral portion 31a and 31b becomes narrow, Peripheries 31d and 31f and Peripheries 41a and 42a of the ink pack 31 are promoted by joining also from reinforcement being high.

[0046] Thus, since the ink is collected near the point of the connection member 62 even if the residue of the ink in the ink pack 31 decreases, the ink in the ink pack 31 can be used to the last irrespective of some of residues.

[0047] Subsequently, the connection member 62 explains the condition when piercing the ink container 24.

[0048] If it pushes in the direction (that is, almost parallel direction) which meets the both-sides surface parts 31a and 31b in the mid-position of both the free edge of the spring member 32, i.e., the center of the flat part of end section 31c, in the ink container 24 as it is also at the point of the connection member 62 As shown in drawing 4 (b), end section 31c is dented, and while both the free edge of the spring member 32 is pulled in the direction approached mutually by that cause, the center of the both sides of the spring member

32 of a U character configuration is made to buckle by the direction which opens spacing mutually. Consequently, the volume change by the both-sides surface parts 31a and 31b curving to the method of outside becomes large rather than the volume change by denting end section 31c. this shows the original configuration of U typeface spring member 32 to drawing 4 (a) -- as -- method ** of the order -- it becomes easy to curve by making it the configuration which curved for a while beforehand greatly as mentioned above so that spacing may be most opened mostly in a center and spacing may be gradually narrowed toward both ends.

[0049] Since Peripheries 31d and 31f are joined in both ends, said end section 31c makes the configuration to which width of face is becoming narrow gradually as the width of face of a central part becomes the side edge section widely. Thus, it is promoted that the volume change by said lateral portions 31a and 31b bulging in the method of outside becomes large enough rather than the volume change by denting end section 31c as mentioned above according to 31d of peripheries of both ends and the die length for 31f being larger than spacing of the central part of the both-sides surface parts 31a and 31b enough.

[0050] Moreover, since ink feed zone, i.e., the end section, 31c is located inside the virtual extension which extended the both-sides surface parts 31a and 31b When end section 31c which is an ink feed zone can be pierced in a connection member, as shown in drawing 4 (b) According to the external force which end section 31c receives along with lateral portions 31a and 31b, the part by the side of end section 31c of the both-sides surface parts 31a and 31b is made to bias reasonable by the direction which approaches inside mutually, and the central part of lateral portions 31a and 31b curves to the method of outside.

[0051] therefore, when the connection member 62 can be pierced to end section 31c which constitutes an ink feed zone as mentioned above, from producing that a volume change [base / on bulge of said lateral portions 31a and 31b] is larger rather than the volume change by denting end section 31c In case an internal negative pressure condition is raised and the connection member 62 is connected to end section 31c, there is no possibility of ink leaking and coming out from the nozzle of the connection part and recording head 2.

[0052] furthermore, end section 31c becomes it tense almost evenly by energization of the spring member 32 -- having (referring to drawing 4 (a)) -- the -- since the connection member 62 can be mostly pierced in the center, it is inserted in smoothly [it is reasonable and] (refer to drawing 4 (b)).

[0053] Installation of the ink of 2 attracts the ink in the ink pack 31 from the ink container 24 through the connection member 62 with the nozzle side of a recording head 2 to an aspirator (not shown) as well as well-known equipment to a recording head. Or a pressure is applied to the ink pack 31 and it is carried out by extruding ink. At the time of record actuation, since the negative pressure condition in the ink pack 31 is acting to a nozzle in the condition of having filled up with ink, to the nozzle of a recording head 2, ink leaks, and does not come out it from a nozzle.

[0054] In the above explanation, although an example of the gestalt of operation of this invention is explained, various modification is possible for this invention so that it may not be limited to it and may explain below.

[0055] (1) Although he is trying to locate the spring member 32 whole in the gestalt of said operation while decompressing a closed space 43 between inside-and-outside both the packs 41 and 42 Make it the configuration laid underground so that the spring member 32 may be pinched among the both, without decompressing between inside-and-outside both the packs 41 and 42, or Moreover, in the ink pack, a part or all of a spring member is embedded, and considering as the configuration which makes only end section 31c one layer etc. should just be unified so that it may be easy to pierce the configuration and the connection member 62 which lay only the attachment sections 33 and 33 of the spring member 32 underground in an ink pack and they may become.

[0056] (2) In the gestalt of said operation, although the both-sides surface part of an ink pack deforms with an energization means, this invention is not limited to it, covers one [at least] whole lateral portion abbreviation among both-sides surface parts, for example, establishes an energization means, and can energize it in the direction left to the lateral portion of another side.

[0057] (3) Various configurations -- two or more spring parts project towards Circumferences 31d and 31f at a right angle from the central part 33a1 besides the thing of the gestalt of said operation -- are possible for the configuration of a spring member.

[0058] (4) In the gestalt of said operation, although equipped as it is, an ink container can be contained in the cartridge case which has ink feed holes, and can also be used as an ink cartridge. namely, -- for example, the ink feed holes of a cartridge case carry out a sealing seal in the sealing member which consists for example, of a rubber ingredient -- having -- this sealing member -- receiving -- said hollow -- the needlelike connection member 62 -- poking -- ***** -- it is able to make it for penetration to become possible by things.

[0059] (5) In drawing 1 , although the recording head and the ink container are turned horizontally, it can

carry out also in what a recording head injects ink caudad, and detaches and attaches an ink container in the vertical direction.

[0060]

[Effect of the Invention] This invention is carried out with a gestalt which was explained above, and does so effectiveness which is described below.

[0061] Since he is trying to energize invention of claim 1 with an energization means in the direction which leaves mutually the both-sides surface part of the saccate ink pack which has the deformable flexibility by which it has two lateral portions which counter and ink is contained inside Even if it can constitute an ink supply system by making the ink in an ink pack into a negative pressure condition and is arranged more nearly up than a recording head by it, it can lose ink leaking and coming out from the nozzle of a recording head. Since he is trying to lay an energization means under the ink pack itself especially, special attachment is unnecessary, can make it into easy and cheap structure, and it is easy to make it automate, and excels also in mass-production nature.

[0062] Since invention of claim 2 makes the ink pack the duplex pack structure which consists of a pack of the inside and an outside, it is locating an energization means in a closed space between both packs, and can lay an energization means underground simply in an ink pack.

[0063] Since invention of claim 3 makes the closed space of an ink pack the reduced pressure seal condition, it can make the pack and energization means of an outside and the inside able to unify, and can make the energization force of an energization means act on an ink pack (pack of an outside and the inside) efficiently.

[0064] Since invention of claim 4 is considering as the tabular spring member which has the two attachment sections located near the both-sides surface part of an inside pack in an energization means, and the connection section of U typeface which connects this both attachment section across the edge of an inside pack, it is easy structure and can constitute an energization means to energize in the direction which leaves the both-sides surface part of an ink pack mutually.

[0065] Since invention of claim 5 makes the attachment section of a spring member the shape of a flat spring which was multiple-times-crooked, or curved from the joining segment with the connection section located in the center, and has been prolonged outside, it sets at least to each part of an ink pack, the energization force is changed, it adjusts, and ink can be consumed efficiently.

[0066] The 1st part of the shape of a typeface of KO by which invention of claim 6 formed the attachment section of a spring member in bilateral symmetry, and the end section was connected with the connection section for each part on either side, Since he is trying to have the 2nd part of the shape of a typeface of KO by which it is installed by this 1st part and the end section is connected with the other end of the 1st part It becomes possible simply to cover the whole abbreviation on the front face of an outside of the both-sides surface part of an ink pack, to prepare the attachment section of a spring member, to cover the whole outside front face, and to make the energization force of a spring member act, using effectively the 1st and 2nd parts of the shape of a typeface of KO. Since the energization force becomes small as it separates from the connection section with it, the energization force by the 2nd part becomes smaller than the energization force by the 1st part, and it can set up easily so that the ink of an ink pack may be effectively consumed by it.

[0067] Invention of claim 7 bends a sheet-like ingredient for an ink pack, welds the circumference, forms it in saccate, strains this bending part by energization of an energization means, and can be made saccate [of a three-dimensions configuration].

[0068] Since invention of claim 8 is laying underground an energization means to energize in the direction which separates [as opposed to / for one lateral portion / the lateral portion of another side] a circumference part from a central part by the small force among the both-sides surface parts of an ink pack If it can energize in the direction which leaves [as opposed to / for one / said / lateral portion / the lateral portion of another side] a circumference part by the small force and an ink residue becomes less than a central part, the ink in an ink pack can be brought together in a center section, and ink can be consumed efficiently.

[0069] Since he is trying to equip invention of claim 9 with the 1st part energized in the direction from which an energization means separates the central part of one [said] lateral portion to the lateral portion of another side, and the 2nd part prolonged along with one [said] lateral portion from the 1st part Without complicating structure of an energization means, in one lateral portion, it can energize in the direction left to the lateral portion of another side by the force in which a circumference part is smaller than a central part, and ink can be consumed efficiently as mentioned above.

[0070] Since it is multiple-times-crooked, or said 2nd part curves from the 1st part and he is trying to prolong it towards the circumference part of a lateral portion, as mentioned above, rather than a central part,

invention of claim 10 can realize energizing a circumference part by the small force with an easy configuration, and can consume ink efficiently.

[0071] Since invention of claim 11 has set up the part which the energization force of a spring means separated from the point of the connection member combined with the ink container so that it may become smaller than a near part, if its residue of ink decreases, according to the energization force of said spring means, ink will be collected near the point of a connection member and can consume the ink in an ink pack efficiently.

[0072] Invention of claim 12 the part in which the point of a connection member is located in one lateral portion by the 1st part of a spring means Since it energizes positively in the direction left to the lateral portion of another side and he is trying to prolong the 2nd part along with one [said] lateral portion from the 1st part With easy structure, it can realize with an easy configuration making it the direction of the part which left the energization force of a spring means from the point of a connection member become smaller than a near part, and ink can be consumed efficiently.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the outline configuration of the ink jet recording device concerning this invention.

[Drawing 2] It is the perspective view of the spring member concerning this invention.

[Drawing 3] The cross section of the cross direction of the ink container concerning this invention is shown, and drawing in which (a) shows the condition of the beginning of ink use, and (b) are drawings showing the condition of the last of ink use.

[Drawing 4] The longitudinal section of the longitudinal direction of the ink container concerning this invention is shown, and they are drawing showing the condition before (a) pierces a connection member, and drawing showing the condition of the moment (b) pierces a connection member.

[Description of Notations]

24 Ink Container

31 Ink Pack

31a Lateral portion

31b Lateral portion

31d Periphery

31e Periphery

31f Periphery

32 Spring Member

33 Attachment Section

33a The 1st part

33b The 2nd part

34 Connection Section

51 Ink Jet Recording Device

52 Recording Head

62 Connection Member

[Translation done.]